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ZOOLOGY AND THE WAR

By Professor MAYNARD M. METCALF

OBERLIN, OHIO

THE request to write upon zoology and the war suggests two lines of thought—first the contribution zoology is making, and may make, to effective conduct of war activities of various sorts, and second the effects upon zoological science and practise likely to follow from the war. Both are worth considering.

Speaking broadly, no other science is doing more, perhaps none as much as zoology, or rather biology, to promote effective and successful prosecution of the war. This seems a strong statement, as one thinks of our dependence upon chemistry for explosives and a thousand other products, upon mechanics for ordnance and all sorts of war engines and upon engineering for the great activities of military and naval construction. Of course all the sciences are so interdependent that no comparisons can really be drawn. The statement is of value chiefly to challenge attention and persuade the reader to examine the relation of zoology—purely scientific zoology—to the problems of the war.

Man is an animal and all our knowledge of him and his activities is biological and all our methods of dealing with him and his life must be founded upon biological science. A mere roster of the biological sciences is sufficient to show our dependence. Some of these are: Morphology, including anatomy and embryology; physiology, both normal and pathological; ecology, including parasitology with bacteriology as its major subdivision; genetics; psychology; surgery and scientific medicine are but an application of anatomy, physiology and parasitology; and perhaps as vital as any in its effects upon all human life has been the knowledge of the fact of evolution.

It is often said this war is a scientific war and it is true both in its destructive aspects and in its safeguarding and protecting features. It is equally true that when all is said as to guns and explosives and poisonous gases, the last word lies with the man power of the belligerents. And it is here that zoology's great service is rendered. It is purely biological studies that have made possible the assembling of great numbers of men without disease slaying far more than fall before the guns of the enemy. The surgery which restores ninety per cent. of the wounded would be impossible without the knowledge reached by decades of parasitological research. Our knowledge of sanitation and the prevention of infectious disease has doubtless saved many more combatants and non-combatants than have been slain in all the battles. It isn't only Serbia which has been saved from typhus. Without our knowledge of the method of transmission of this disease, and the preventive measures thus made possible, all the belligerent nations would have been worse than decimated by this scourge. Typhoid fever, cholera, bubonic plague, smallpox, would each have taken similar toll. For every dozen lives lost from battle, hundreds would have been destroyed by infectious diseases which we are now able to hold in check.

Of course there are many lesser contributions to war effectiveness through animal husbandry and our knowledge of the sea and its life—all dependent upon zoological research.

But more important than any or all of these specific benefits from biological research has been the introduction of the era of scientific thinking, which since Darwin's time has been replacing superstition and ignorance. Step by step the physical sciences fought their way to recognition, but the dawn of the new age really came only when the phenomena of human life were recognized as biological and the puerile distinction between science and the humanities was destroyed. From this time the approach to human problems could be truly scientific without reservation, and the ideals themselves could be scientific. Tested truth, that is science, became the means and the goal.

It is this change in our whole habit of thought that has brought the advance in all lines of science, giving us our discoveries and inventions, creating whole new departments of science before undreamed. We must not overestimate biology's share in this emancipation of the human mind. Its contribution was later and more conspicuous, but no more real, than those of other sciences. The promulgation of the idea of evolution, coming last, as it did, and attacking superstition in its very citadel in the life of man, was recognized by opponents of the scientific spirit as bringing the last ditch fight. Without this fight and its victory for the forces of progress, the scientific development of the last fifty years could never have occurred. Biology therefore has had its full share in bringing the present day of science. It is this great spiritual contribution to human life that most merits recognition, for from this have flowed all the beneficent activities in every field of science.

Recognizing then the broad service of zoology with the other sciences in helping to the emancipation of man's mind, and remembering as well the special services in medicine, surgery and sanitation and in the production of food and clothing, the zoologist to-day may be somewhat consoled for the fact that in general it is more difficult for him than it is for the chemist or physicist to find ways to use effectively his special training in immediate war service. The transition from pure zoology to special war service is more difficult than that from chemistry or physics.

And it is just here there lies a very real danger to zoological science and to society. The earnest desire to serve in the great emergency, to take an immediately effective share in the strenuous tasks of the war, seems altogether likely to result in overemphasis upon the idea of practical applications in science, to the detriment of the pure science that is the fountainhead. The danger is real.

In some ways zoology is more exposed to injury than some of the other sciences. The pure zoologist must be a good bit of an idealist. Choosing zoology one chooses poverty. In medicine there is fair monetary return. The chemist or physicist knows that in this day of great industrial development and of great construction he can always, if need be, find employment for his trained abilities in ways to bring him money. But in turning to zoology a young man takes Franciscan vows of poverty of purse and enters upon the simple life. This is a sufficient handicap for our science. Add to this the somewhat general impression that in this war the zoologist has often found difficulty in rendering service in the line of his special training and there is real danger of further disadvantage to zoology and of a considerable reduction in the number of college and university students choosing zoological science as their life work. Philistinism, overestimate of the so-called practical, may be as harmful in science as in esthetics.

What is the most helpful attitude in science? What spirit is most productive in research? Is it the desire to make discovery for the sake of financial profit to the student? Is it personal ambition for honorable and dignified position among men of science? Is it the purpose to bend every effort immediately toward direct promotion of human welfare? No, it is something far different from any of these. The man works best who is in the thing for the fun of the game, who follows science because of interest in science itself and not so much in the so-called practical benefits reached through scientific research. There is no field in which singleness of purpose counts for more than it does in science.

There is the greatest danger that ulterior motive will warp the judgment of the student, and if he attempts too much to guide his studies toward practical utility he is less likely to reach major results than if he humbly allows his science to lead him where it will. All science is one great system of truth, interlocked in countless ways, and at almost every step in its pursuit there open to the student great vistas of unexplored territory—heights of vantage from which, when attained, he may view certain areas as a whole and grasp their true relations. The big things in science come through those who are seeking these visions, rather than through those who are searching at each step to gather some nugget of commercial value. In science, as in all life, it is idealism that leads to largest result, and the progress of the world in so-called practical lines is dependent upon the idealist more than upon the student with more immediate purpose. The future of science and of society rests with the seekers for the vision, those who search for understanding of truth for the joy of knowing the truth, rather than the profit such knowledge may bring.

Periods of great emphasis upon the *utilization* of science, such as is this time of war, bring danger of false estimates. There is real risk that the immediate will loom disproportionately large and that the spirit of searching for truth for the very joy of its attainment may in a measure be lost, and it is this spirit that is needed to "guide us into all truth."

One very real service the devotee of pure science can render, therefore, is to keep burning, and burning brightly, the fire upon his altar. Like his brother in other fields, the zoologist should recognize that he worships at no unworthy shrine, and he may well allow others to see something of his loyalty and of his pride in his service. May the light from his altar fire guide many another earnest student to the same shrine, though in coming he passes broader and easier paths.

There is much to-day to discourage. The moving picture, the cheap magazine, the daily newspaper, are real indications of low standards of taste in the drama, in literature and in all life. It seems the day of the low-brow. The man of science who seeks truth in all her beauty can do his full share in resisting this resurgence of philistinism and tawdriness, and he can do it by insistence for himself upon the worthier quest. Can he render in the end any greater national service?